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The University of Southern Mississippi

The Comparison of the Effectiveness of Using a Traditional Approach to Speech Therapy  
to Using a Traditional Approach to Speech Therapy Plus Non-Speech Oral Motor  
Exercises in Children with Articulation Disorders

by

Alanna Buckley

A Thesis  
Submitted to the Honors College of  
The University of Southern Mississippi  
In Partial Fulfillment  
Of Requirements for the Degree of  
Bachelor of Arts  
in the Department of Speech and Hearing Sciences

May 2014



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### **Abstract**

This study focuses on an area of debate in the field of Speech-Language Pathology with little prior research on the topic. The thesis considers the use of non-speech oral motor exercises in children with Articulation Disorders. Understanding the reasoning behind the use of these exercises as well as the reasons that cause the exercises to be controversial are discussed. Data is collected from four clients at the University of Southern Mississippi Speech and Hearing Clinic. All four clients have Articulation Disorders; non-speech oral motor exercises are used in therapy with two of the clients in addition to a Traditional Approach to speech therapy. This study hopes to make way for future research to determine a concrete decision on the use of these exercises.

Keywords: Speech Disorder, articulation, Speech and Hearing Clinic, traditional therapy, exercises, speech-language pathology

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## **Chapter 1: Introduction**

The American Speech-Language-Hearing Association (ASHA) claims that 1,460,583 children in public school systems received services for speech or language disorders. This number is likely a low calculation, as it does not include children that received private therapy, or those speech/language issues that are considered secondary problems to other conditions (ASHA, 2008).

An articulation disorder involves problems producing the correct speech sounds; the sounds can be "substituted, left off, added, or changed" (ASHA, 2014). Speech sounds are physical sounds that are the end products of articulation, and when a person's oral communication differs from normal speech to the point of interfering with communication, it is labeled a speech disorder (Bauman-Waengler, 2012). An articulation disorder is a type of speech sound disorder (ASHA, 2014). Treatment for speech sound disorders varies from clinic to clinic and even from speech pathologist to speech pathologist. Many children outgrow their speech issues, but as the opening sentence reflected, many children do not. Speech development charts are easily accessible from the Internet that show the ages at which children should acquire certain sounds. According to ASHA (2014), a child should be able to produce all English sounds correctly by the age of eight. If speech sound issues have not been eliminated naturally by age eight the issues are referred to as "residual" or "persistent" speech sound errors and therapy should be sought for these errors to be eliminated (Shriberg, Kwiatkowski, & Gruber, 1994).

A few of the more popular forms of treatment for articulation disorders are the Cycles Approach, Minimal Pairs Therapy, Target Selection Intervention, and a Traditional

Approach (Bauman-Waengler, 2012). As many as 85% of Speech-Language Pathologists (SLPs) implement non-speech oral motor exercises (NSOMEs) in addition to traditional treatment for articulation disorders (Lof & Watson, 2008). Non-speech oral motor exercises have become a highly debated issue in the speech-language world, due to the fact that most of the supporting evidence consists of uncontrolled subjective reports (Powell, 2008).

NSOMEs aim to influence the development of speech without requiring a child to produce a speech sound (Lof & Watson, 2008). The thought process behind this approach supports the fact that speech production is a motor skill, therefore strengthening the muscles used for speech should be similar to motor strengthening assisting in non-speech motor learning (Maas, et al. 2008). In actuality, modern theories believe speech production is a combination of the cognitive-linguistic system and the motor system. NSOMEs focus almost exclusively on motor control. (Powell, 2008).

Speech-Language Pathologists use NSOMEs to increase tone and strength of the speech musculature by teaching children to use primitive oral behaviors such as sucking or chewing, with belief that physical exercises will help develop speech sounds (Lof & Watson, 2008). Some examples of exercises used by clinicians are "blowing, tongue push-ups, pucker-smile, tongue wags, big smile, tongue-to-nose-to-chin, cheek puffing, blowing kisses, and tongue curling" (Lof, 2009).

Techniques used by clinicians should stem from evidenced-based practice (EBP). Evidence-based practice means the research evidence, clinical expertise, and client values all agree on the same conclusion (Muttiah, Georges, & Brackenbury, 2011). The concern by researchers in the field, such as Lof and Watson (2008), is that SLPs are using



NSOMEs based on perceived changes and not evidence-based results. Lof and Watson's study showed that 85% of Speech-Language Pathologists use NSOMEs, but there is no research evidence to support the use (2008). This is why non-speech oral motor exercises are so controversial; the exercises lack research evidence, yet the majority of clinicians continue to use these exercises based on their personal expertise, preference, and perceived success (Muttiah, Georges, & Brackenbury, 2011).

It is difficult to directly research the practice of NSOMEs as they are always used in conjunction with other techniques (Muttiah, Georges, & Brackenbury, 2011); therefore it is difficult to isolate their impact on speech therapy. Without controlled experiments discriminating between observed changes it is tough to attribute success to the treatment itself or to the combination of treatments (Powell, 2008). The main question that needs answering is whether children receiving strengthening exercises have better and/or faster outcomes than those who do not use them.

## Chapter 2: Literature Review

This study seeks to determine if the speech outcomes of children receiving non-speech oral motor exercises along with a Traditional Approach to articulation therapy differ from those only receiving a Traditional Approach to articulation therapy. Due to the lack of research done on this particular subject thus far in the field of Speech-Language Pathology, data on the subject is extremely limited. Apart from the 2005 study from Guisti Braislin & Cascella and the 2010 study from Ruscello, the literature reviews are not clinical studies but rather gatherings of data on the use of non-speech oral motor exercises.

The literature review for this study can be divided into three areas: the use of non-speech oral motor exercises, evidenced-based practice, and the reason Speech-Language Pathologists use non-speech oral motor exercises.

### *Use of Non-Speech Oral Motor Exercises*

First is the determination of the use of non-speech oral motor exercises by Speech-Language Pathologists. Lof and Watson (2008) did a study surveying Speech-Language Pathologists (SLPs) nationwide on their use, or lack of use, of non-speech oral motor exercises (NSOMEs). The research found that 85% of SLPs use NSOMEs on clients with speech sound disorders. Clinicians tend to rely the most on the clinical expertise aspect of evidenced-based practice, therefore even though NSOMEs lack research evidence, clinicians use the exercises based on personal experience (Muttiah, Georges, & Brackenbury, 2011). There is a great need for a theoretical base for the use of these exercises in treatment (Powell, 2008). Advocates of the exercises need to obtain

unbiased research to provide evidence to support the use of non-speech oral motor exercises (Powell, 2008).

### *Evidenced-Based Practice*

Treatments used by Speech-Language Pathologists should be derived from evidence-based practice. Kamhi (2006) discussed evidenced-based practice (EBP) explaining that EBP is the combination of research outcomes, clinical expertise, and client values. Kamhi argues that treatment should not be based solely on research or clinical experience, which can be biased (2006). Clinical support for the use of NSOMEs extends from the belief that since speech production is a motor skill, it must be governed by the same principles of motor learning (Maas, et al. 2008). Drawing from Kamhi's belief, Clark (2003) researched techniques implemented by occupational and physical therapy in relation to how they could benefit speech. It leads to the question of whether strength and endurance affects speech performance, rather than how the techniques are applied (Clark, 2003). There are few studies that have directly worked with the treatment of speech motor learning, therefore the effectiveness is difficult to determine (Maas, et al. 2008).

As Powell (2008) pointed out, it is impossible to see which treatment is working without controlling the experiment. Powell also pointed out that NSOMEs focus on motor control. It could be hypothesized that the exercises would be beneficial to children with oromotor deficits. Unfortunately, data is not available to test this hypothesis and the exercises have not been shown to be more effective in resultant change among persons with speech disorders (Powell, 2008).

*Reasons Speech-Language Pathologists Use NSOMEs*

Knowing the reasons Speech-Language Pathologists use non-speech oral motor exercises is essential. One study completed by Ruscello (2010) attempted to analyze NSOMEs effectiveness. The researcher studied nine participants learning various sounds with NSOMEs and other sounds without NSOMES to determine if those that used phonetic based speech sound production treatment were more effective than NSOMEs in modifying speech sound skills. Ruscello (2010) discovered that the mean average increase for the sample exposed to the phonetic-based production treatment was 30% from baseline scores, while for the sounds treated with NSOMEs the mean averages increased 3%.

Steele, et al. (2010) found that resistance training does improve tongue strength, which made the exercises useful in helping to improve swallowing functions. SLPs appear to use NSOMEs in treatment due to professional observations. Frequently, SLPs base treatment approaches on personal experience or the experience of peers. Complicating matters for Speech-Language Pathologists is the fact that there are few peer-reviewed journals that focus on the therapy influences. Finally, most SLPs report remaining "up-to-date" through workshops, therefore the knowledge that is available to them often is not peer-reviewed (Lof and Watson 2009). Lof and Watson (2009) found that 85% of SLPs use NSOMEs, yet in the 2009 study only 25% of university professors taught the use of non-speech oral motor exercises.

Lof and Watson's (2008) finding that so many Speech-Language Pathologists use NSOMEs with clients astonished the researchers, not only because such a majority of professionals use a debatable treatment method, but also due to the fact that NSOMEs are

not based on evidenced-based practice (EBPs). According to Muttiah, Georges, & Brackenbury (2011) this highlights the difference in opinions of clinicians and clinical researchers. Since every Speech-Language Pathologist in the country was not surveyed, there is room for argument about the percentage amount, however the fact remains that the majority of Speech-Language Pathologists use a method that has yet to be proven efficient. In Ruscello's 2010 study, the researcher compared phonetic-based production treatment to using non-speech oral motor exercises in treatment; however this study did not provide sufficient evidence to support or refute the use of non-speech oral motor exercises.

In Lof and Watson's 2009 study, the research found that only 25% of college professors teach non-speech oral motor exercises, which conflicts with the 85% of practicing Speech-Language Pathologists that claim to use the exercises in treatment. This information is of importance due to the fact that if so many are using this treatment, yet so few are teaching it, the exercises need to be proven effective or ineffective. Powell's 2008 study pointed out that using NSOMEs can increase the number of treatment sessions before the treatment goal is met, and cautions that scientific and ethical safeguards need to also be taken into consideration. This topic should either be deemed functional and successful so that the exercises can be taught to all aspiring Speech-Language Pathologists, or the exercises should be disproved so practicing Speech-Language Pathologists stop the use of an ineffective treatment method. As Powell pointed out, a theory must be defined for NSOMEs, and then it must be tested and revised according to findings.

### **Chapter 3: Methods**

The aim of this study is to determine whether the speech outcomes of children receiving speech sound therapy using non-speech oral motor exercises differ from those children who receive traditional speech sound therapy methods, which are a variety of long standing treatments that are scientifically based and peer reviewed.

#### *Sample*

The sample for this study includes the records of four school-aged children receiving therapy by graduate students at the University of Southern Mississippi's Speech and Hearing Clinic. The clients were already being treated by the clinic at USM, and were not chosen for treatment based on this research. All the clients had been receiving therapy for various amounts of time. The clients ranged in age from four to eight years old. The clients all came from middle class families, though it ranged from upper middle class to lower middle class. The Speech and Hearing Clinic at the University of Southern Mississippi provides services for all types of speech and language disorders including Fluency Disorders, Aphasia, Apraxia, and Autism. Often clients that suffer from articulation disorders also have language disorders. This sample was narrowed down to clients that only had articulation disorders and were in the same age range. The same number of clients receiving non-speech oral motor exercises during treatment to clients that were not receiving the exercises during treatment had to be observed. The combination of all the preceding factors led to the sample size of four clients. This should not raise concern, as the field of Speech-Language Pathology does not often have

large sample sizes. The following are examples of published research in the field with similar sample sizes:

In a study with many parallels to this research, a 2005 study of oral motor exercises for children with articulation disorders worked with four participants, two boys and two girls, with fifteen half-hour sessions of therapy and compared the findings on the clients' pretest and post-tests (Guisti Braislin, M. & Cascella, P.) This thesis study also used four clients and compared the pretests and post-tests, but therapy was conducted in hour sessions bi-weekly for twelve weeks, which was a much longer time frame than Guisti Braislin and Cascella's study. A study in 2008 looked at parent-child interaction therapy with children suffering from fluency disorders, and six participants were examined (Millard, S., Nicholas, A., & Cook, F.) Lastly, a 2014 study of persons with aphasia conducted six weeks of treatment on eight participants (Brookshire, C.E., Conway, T., Pompon, R. H., et al.).

### *Procedures*

Therapy procedures differ from client to client. All four of the clients had articulation disorders and were receiving widely accepted treatment approaches as the main form of therapy. Two of the clients were receiving non-speech oral motor exercises on top of a Traditional Approach to speech sound therapy. These exercises occurred at the beginning of the session and included exercises involving moving the tongue side to side, moving a small sucker from side to side with just the tongue, or pushing the tongue up and down against a spoon. Each client received one-hour sessions twice a week for twelve weeks.

*Variables*

For this study, client progress was collected by examining each client's records starting August 2012 and ending in late November 2012. The clients were also observed intermittently throughout the semester. The variable to be determined was accuracy. The client's progress was based on the baseline accuracy compared to the post-treatment accuracy. The records contain the speech errors of the client, long term goals, semester goals, SOAP notes, and therapy procedures set by the graduate student and the supervising clinician. Each client's evaluation procedures state that data was collected during each session to monitor the client's progress. The graduate clinicians keep records of each session in the form of SOAP notes. SOAP is an acronym for subjective, objective, assessment, and plan. This specific method of documentation allows graduate students, as well as other healthcare workers, to track data collected during each session. Furthermore, a post-test was administered at the end of the semester to evaluate progress. In conjunction with the common practice of the field, the Speech and Hearing Clinic at the University of Southern Mississippi determines progress with the comparison of baseline and post-treatment accuracy. Speech therapy is a slow process, and while data is meticulously collected and documented during and after each session, inclusion of such information would hold no value in determining results. Examples of such practice can be viewed in Guisti Braislin and Cascella's 2005 study, where the results were based off the clients' pre- and post-tests after fifteen half-hour sessions. It can also be viewed in Ruscello's 2010 study of ten children with articulation disorders. The efficiency of the two treatments Ruscello observed was calculated by finding the difference in the clients' pre-treatment and post-treatment sound probes (2010).



*Validity*

The student clinicians were constantly gathering data. The graduate students keep records of each session with the client. At the end of the semester the student clinicians and supervisors performed the post-test. The results were then compared to the goals set at the beginning of the semester. An argument can be posed that some of the evaluations of progress could be subjective to each clinician. An example of a goal that could differ from person to person is, "The client will produce /r/ in isolation with 60% accuracy". The accuracy is determined by how many words the client was given compared to how many the client pronounced correctly. For example, if a client said /r/ in isolation twenty times and pronounced /r/ correctly ten times, the client would have produced /r/ in isolation with 50% accuracy. This method allows a steady accuracy rating from clinician to clinician.

Helping keep results consistent is the common practice of describing sounds in isolation, sentences, phrases, and in conversation. The ability to perform a sound in conversation shows success of correcting that sound error. In order to analyze the data, the progress made by each individual client will have to be taken into consideration. Not every client will be able to produce /r/ in sentences with 90% accuracy. In order to analyze the data, the clients must be individually examined by the baseline, or starting point, and the post-test to determine the process made throughout the semester.

A student clinician making a client's progress seem greater than actuality is not an issue. It is a simple process to determine if the goals were met or not. If the clinician states that a client can now produce /t/ in sentences with 70% accuracy, but the client cannot perform on said level, the student clinician would be discredited and receive an

unfavorable grade. It is doubtful a graduate student would take such an unnecessary risk simply to meet a pre-set goal since grades are not based on client performance.

The post-test outcome does not automatically translate to the next semester's baseline. Some clients may regress during the break while others may move forward. Constant assessment allows the clinicians to keep up with the client's development step by step. Each case differs, creating the need for progress to be based on individual progress rather than charts or percentiles.

### **Chapter 4: Results**

All four clients made progress during the semester the documented outcomes were assessed. Participant A and B utilized non-speech oral motor exercises while Participants C and D did not. Each phoneme was not assessed, rather /r/ was assessed for Participants A, B, and C and /m/ was assessed for Participant D. Participant D's clinician did not choose to work with /r/ in the semester data was collected. The full results can be found in Table 1. Overall, Participants C and D, who did not use non-speech oral motor exercises, made slightly more progress than Participants A and B, who did use non-speech oral motor exercises during therapy. Participant A improved 28% with /r/ in isolation, Participant B improved 20% with /r/ in the initial position and 48% with /r/ blends in the initial position, Participant C improved 68% with /r/ in isolation, and Participant D improved 27% with /m/ in the initial position and 57% with /m/ in the medial position.

#### *Implications and Limitations*

The small number of clients assessed for this study limits the data that was able to be collected. Four young clients' records were assessed. The clients were within similar age ranges, but did not begin therapy at the same time. All four were being treated for articulation disorders, however each one did not have identical issues or equal levels of severity. It is important to remember when dealing with speech disorders of any kind, including the articulation disorders discussed, each case is unique.

## **Chapter 5: Discussion & Conclusion**

### *Limitation Considerations*

The small sample size is the result of the heterogeneous population receiving speech and/or language therapy. The four clients only had speech disorders, which restricted the participant options. Another consideration is the different phoneme comparisons. All four clients are not being assessed on the same phoneme in the same position (isolation, initial, medial, etc.). After consultation with Dr. J.T. Johnson, the director and research consultant for the Center for Research Support at the University of Southern Mississippi, it was determined that the sample size was too small for statistical analysis to be useful. Dr. Johnson explained that the heterogeneous nature of the population makes any sort of statistical manipulation difficult and not significant. This is not only due to the difficulty in finding similar candidates, but also due to every issue being so diverse.

### *Future Research*

Future studies should observe larger pools of participants and divide the participants in groups according to severity, longevity of therapy, and age. By placing stricter guidelines on participant qualifications, research can reach more accurate conclusions concerning the use of non-speech oral motor exercises in clients with Articulation Disorders.

### *Conclusion*

All four participants made notable strides in the phonemes assessed. The use of non-speech oral motor exercises during therapy did not significantly impact improvement. An official, national determination cannot be reached without further research that the

non-speech oral motor exercises do not make a significant difference in Articulation Disorders and therefore should be banned during therapy. However, this research does suggest that the use of non-speech oral motor exercises in therapy should be questioned. The results imply that the exercises do not provide more improvement than just traditional therapy; therefore it can be argued that no useful purpose is served. Further research is extremely necessary since this evidence suggests that the use is not worth the time of the client.

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## Appendices

### Appendix A

**Table 1**

**Pretest and Post-Test Comparisons of Clients Using Non-Speech Oral Motor**

**Exercises along with a Traditional Approach to Speech Therapy to Clients Receiving  
Solely a Traditional Approach to Speech Therapy.**

<b>Production</b>	<b>Participant A</b>	<b>Participant B</b>	<b>Participant C</b>	<b>Participant D</b>
<b>September 2012</b>	/r/ in isolation with max. cueing =  <b>22%</b>	/r/ in initial position =  <b>33%</b>  /r/ blends in initial = <b>25%</b>	/r/ in isolation =  <b>0%</b>	/m/ in initial position =  <b>73%</b>
<b>November 2012</b>	/r/ in isolation =  <b>50%</b>	/r/ in initial position =  <b>53%</b>  /r/ blends in initial = <b>73%</b>	/r/ in initial position of syllables =  <b>68%</b>	/m/ in initial position =  <b>100%</b>  /m/ in medial position =  <b>57%</b>

**Appendix B****THE UNIVERSITY OF SOUTHERN MISSISSIPPI****SPEECH-LANGUAGE-AUDIOLOGY CLINIC****CLINICAL AGREEMENT**

The University of Southern Mississippi Speech-Language-Audiology Clinic was established primarily for the purpose of teaching and training students. By utilizing the services of the clinic, the client should understand that, in order to accomplish teaching and training goals, it is frequently necessary that observation, audio and/or tape recording or other media be used. However, it should be clearly understood that the information obtained from or divulged by the client is confidential. I understand that any written information exchanged will be done only with my written permission.

I hereby consent to the diagnostic testing conducted by the faculty, staff and graduate students. I further consent to the observation, listening, photographing, audiotaping and/or videotaping of any or all interviews, therapy or testing sessions in the USM Speech-Language-Audiology Clinic with the understanding that such observation, listening, photographing, audiotaping, and/or videotaping is strictly for teaching and research purposes.

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Signature

---

Relationship to Client

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Date

---

Witness

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Date